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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,082	02/27/2002	Kong-Beng Thei	TS99-274B	8062

28112 7590 05/02/2003

GEORGE O. SAILE & ASSOCIATES  
28 DAVIS AVENUE  
POUGHKEEPSIE, NY 12603

EXAMINER

ROMAN, ANGEL

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 05/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/084,082

Applicant(s)

THEI ET AL.

Examiner

Angel Roman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 21-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 21 and 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Cheek et al. U.S. Patent 6,018,180.

Cheek et al. discloses a Salicide field effect transistor with improved borderless contact openings comprised of; a semiconductor substrate 210 doped with a first conductive type dopant (see column 4, lines 49-52) and having device areas surrounded and electrically isolated shallow trench field oxide areas (220, 230); a gate

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oxide layer 250 on said device areas, and a conductively patterned polysilicon layer 260 over said device areas for gate electrodes; lightly doped source/drain areas (310, 300) with said second conductive type dopant in said device areas adjacent to said gate electrodes 260 and insulating sidewall spacers (280, 290) on the sidewalls of said gate electrodes 260; heavily doped first source/drain contact areas (320, 330) composed of said second conductive type dopant in said device areas adjacent to said insulating sidewall spacers (280, 290); a cobalt or titanium silicide layer 270 on said gate electrodes and on said source/drain contact providing said Salicide field effect transistors (see column 5, lines 11-21); a conformal barrier layer 360, and an interlevel dielectric layer 440 on said Salicide field effect transistor; borderless contact openings 450 in said interlevel dielectric layer 440 and said barrier layer 360 to said source/drain areas and extending over said field oxide 220 with unintentional over-etched field oxide regions at said field oxide-source/drain area interface (see figure 14); a dopant composed of said second conductive type in said substrate under and adjacent to said over-etched field oxide regions in said borderless contact openings and providing said source/drain contact areas with conformal a continuous ion implanted doped region 380 in said substrate surrounding said unintentional over-etched field oxide regions and said ion implanted doped region is shallower than said source/drain contact areas (see column 8, lines 44-53; column 7, lines 23-27; column 5, lines 60-64). Cheek et al. also discloses a first conductive type dopant (P-type dopant) and a second type dopant (N-type dopant) for Salicide N-channel FETs, and it is well known and inherent to Cheek

et al. disclosure that dopant types could be reversed for P channel salicide FETs (see column 7, lines 19-22).

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheek et al. U.S. Patent 6,018,180.

Cheek et al. is applied as above but lacks anticipation on disclosing a single crystal silicon substrate. It would have been obvious to one having ordinary skills in the art at the time the invention was made to disclose single crystal silicon as the substrate

in the primary reference of Cheek et al. since single crystal silicon is a conventional and suitable silicon semiconductor used to form transistors.

### ***Response to Arguments***

7. Applicant's arguments filed 01/27/03 have been fully considered but they are not persuasive. Regarding applicant's arguments that the implant is performed after etching the opening and therefore is conformal, independent of the depth of the over-etch region of the STI, and self align to the opening and the over-etched region, as specified in the rejection above Cheek et al. also suggest an alternate embodiment for performing the implantation step of the over-etched region by performing the implant after forming the over-etched region as clearly described in figure 14 and explained in column 8, lines 44-53, therefore the implant is conformal, depth independent and self align.

With respect to applicant's argument that the void 460 can be etched below (over-etched) the diffused region 380, there is no indication or suggestion of void over-etching in Cheek et al. as it can be clearly appreciated in the drawings in figure 10.

Applicants also make reference to the relatively low energy implant in the region X, however the low energy implant and concentration suggest by Cheek et al. fall within the same ranges of energy and concentration suggest by Applicants in page 18 of the specification, therefore Applicants claimed device may be obtained by following Cheek et al. alternate ion implantation embodiment of region 380.


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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel Roman whose telephone number is (703) 306-0207. The examiner can normally be reached on Monday-Friday 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

AR  
April 30, 2003

  
John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800